

*BOLORIA FRIGGA SAGA* (NYMPHALIDAE), A SIGNIFICANT NEW RECORD FOR MAINE AND  
NORTHEASTERN NORTH AMERICA

*Boloria frigga saga* (Staudinger), is locally distributed in Alaska and much of Canada south to the northern Great Lakes region of the U.S. where it is limited to northern Minnesota, Wisconsin, and Michigan's Upper Peninsula (Opler & Malick 1992, Layberry *et al.* 1998, Nielsen 1999). Other subspecies occur in the Rocky Mountains of the western states. Until recently, the southeastern most documented locality for this butterfly was in central Quebec, near Chicoutimi (Layberry *et al.* 1998). It was thus by accident that a single very worn female of *B. frigga* was collected on 24 June 2002 by the first investigator, in Northeast Carry Twp in Piscataquis Co., Maine, approximately three miles northeast of Moosehead Lake during surveys for new sites of *Boloria eunomia dawsoni* Barnes & McDunnogh. During a subsequent visit on 12 June 2003 to confirm that a colony of Frigga fritillary existed in this peatland, 82 adults (65 males, 17 females) were observed between 1200 and 1700h (Fig. 1). Adults were also common at this site on 11 June 2004 and 12 June 2007. Other likely breeding resident adult butterflies noted during *B. frigga* surveys at this locality included *Papilio canadensis* Rothschild & Jordan, *Callophrys augustinus* (Westwood), and *Oenis jutta ascerta* Masters & Sorensen. The discovery of the Frigga fritillary was important, both for its significant southward extension of the insect's eastern range in North America, and for its addition to the relatively well-studied butterfly fauna of Maine (Brower 1974, Webster & deMaynadier 2005).

The habitat where Frigga fritillary adults were found can be characterized as an acidic, sphagnum-dominated fen with open-grown, stunted tamarack (*Larix laricina*), and scattered black spruce (*Picea mariana*). Adults were most common in lightly wooded sections of the fen with open flat areas of saturated green sphagnum and patches of bog willow (*Salix pedicellaris*). Other dominant flora in the immediate area included sheep laurel (*Kalmia angustifolia*), rhodora (*Rhododendron canadense*), bog rosemary (*Andromeda polifolia*), Labrador tea (*Rhododendron groenlandicum*), pitcher plant (*Sarracenia purpurea*), northern blue flag (*Iris versicolor*), buckbean (*Menyanthes trifoliata*), bog maianthemum (*Maianthemum trifolium*), cotton grass (*Eriophorum* sp), and other sedges. In northern portions of its range, the Frigga fritillary occupies wet shrubby areas of tundra, or willow swamps and bogs in the boreal forest (Layberry *et al.* 1998, Scott 1986). To

the south, in the northern Great Lake states, the butterfly is limited to muskeg and wetter portions of sphagnum bogs (Nekola 1998, Kriegel & Nielson 2000).

The probable larval host plant for Frigga fritillary at the Maine site is bog willow, which was common in the shrub layer where adults were most common. In Alberta, females have been observed ovipositing on willows and dwarf birch, *Betula glandulosa*, and the larvae feed on these plants (Bird *et al.* 1995). The larvae have also been reared in captivity on a related dwarf birch (*Betula pumila*) in Michigan (Nielsen 1999). However, dwarf birch was not present at the Maine site, and Frigga fritillary was not present in other northern peatlands in Maine where dwarf birch was common. In Alaska, females have been observed ovipositing on arctic avens, *Dryas integrifolia* (Scott 1986).

Adults were generally freshly emerged (males fresh to slightly worn, females freshly emerged) on 12 June 2003, 11 June 2004 and 12 June 2007, suggesting that peak flight occurred in mid June during these years at this locality. One mating pair (Fig. 1) was observed at 1550h on 12 June 2003. Adult nectaring was observed at the Maine locale on several common flowering bog shrubs, including Labrador tea, black chokeberry (*Photinia melanocarpa*), pale bog laurel (*Kalmia polifolia*), rhodora, bog maianthemum, and bog rosemary.

It was anticipated that Frigga fritillary might be patchily distributed in Maine's northern ecoregions, and thus surveys for the species have been on-going after

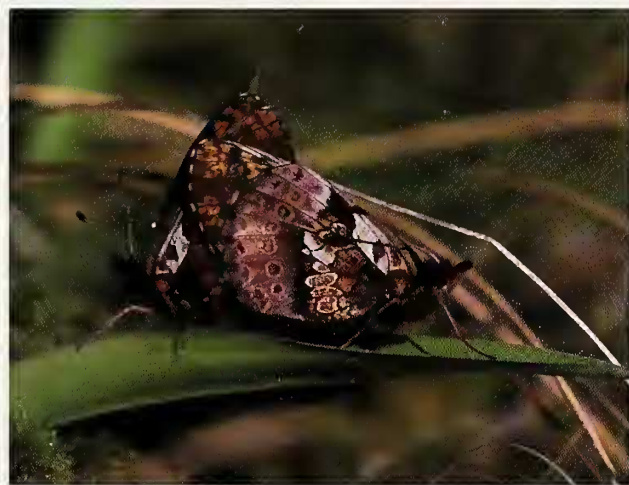


FIG. 1. Mating pair of *Boloria frigga saga* in Northeast Carry Twp, Piscataquis Co., Maine, 12 June 2003

the initial discovery (deMaynadier & Webster 2007). Named appropriately after Frigga, the wife of Odin and goddess of the clouds and heavens in Norse mythology (Bird *et al.* 1995), the flight season of Frigga fritillary is both condensed (approximately two weeks or less) and timed for a period in late spring when cloudy, rainy weather is common at northern latitudes. Hence it may require significantly more survey effort before we fully understand the distribution and status of this insect in the Acadian forests of northern New England and the Maritime Provinces. Nonetheless, eleven additional potential sites have been surveyed to date in Maine, several hosting moderate to abundant populations of bog willow, but no new populations of Frigga fritillary have been found. Notably, the microhabitat at Number 5 Bog, near Jackman, ME was almost identical to the fen in Northeast Carry Typ with an abundance of bog willow. However, Frigga fritillary appears to be absent from this site having been undetected during surveys in both 2004 and 2007. With still only one known breeding colony, the Frigga fritillary is currently listed as a species of special concern in Maine, and the possibility should be considered that only a few isolated, glacial relict populations persist in the Acadian ecoregions of northeastern North America.

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